IN THE CLAIMS:

Please amend the claims as follows:

1. (Withdrawn) In a magnetic read head having an air bearing surface (ABS), a magnetic tunnel junction (MTJ) sensor for connection to sense circuitry for detecting changes in electrical resistance within the sensor, the sensor comprising:

a MTJ stack with an active region disposed at the ABS and having two opposite sides each disposed generally orthogonally to the ABS, the MTJ stack comprising:

an antiferromagnetic (AFM) layer spanning the active region,

a pinned layer of ferromagnetic (FM) material in contact with the AFM layer,

a free layer of FM material spanning the active region and extending beyond each of the two opposite sides thereof, and

a tunnel junction layer of electrically nonconductive material disposed between the pinned layer and the free layer in the active region; and

a longitudinal bias layer formed on and in contact with the free layer outside of the active region for biasing the magnetic moment of the free layer in substantially a predetermined direction in the absence of an external magnetic field.

2. (Cancelled)

3. (Cancelled)

4. (Cancelled)

5. (Cancelled)

6. (Cancelled)

7. (Cancelled)

8. (Cancelled)

9. (Cancelled)

10. (Withdrawn) sensor of claim 1 wherein the longitudinal bias layer comprises an electrically nonconductive HM material disposed outside of the active region and in abutting contact with the two opposite sides of the active region.

11. (Withdrawn) A direct access storage device (DASD) comprising:

a magnetic recording disk having at least one surface for storing magnetically recorded data;

a magnetic read head having an air bearing surface (ABS) disposed for reading the data from the magnetic recording disk surface;

in the magnetic read head, a magnetic tunnel junction (MTJ) sensor comprising:

a MTJ stack with an active region disposed at the ABS and having two opposite sides each disposed generally orthogonally to the ABS, the MTJ stack comprising:

an antiferromagnetic (AFM) layer spanning the active region,

a pinned layer of ferromagnetic (FM) material in contact with the AFM layer,

a free layer of FM material spanning the active region and extending beyond each of the two opposite sides thereof, and

a tunnel junction layer of electrically nonconductive material disposed between the pinned layer and the free layer in the active region; and

a longitudinal bias layer formed on and in contact with the free layer outside of the active region for biasing the magnetic moment of the free layer in substantially a predetermined direction in the absence of an external magnetic field;

an actuator for moving the magnetic read head across the magnetic recording disk surface to access the data stored thereon; and

a data channel having sense circuitry coupled electrically to the MTJ sensor for detecting changes in resistance of the MTJ sensor caused by rotation of the magnetic moment of the free ferromagnetic layer relative to the fixed magnetic moment of the pinned layer responsive to magnetic fields representing the data stored on the magnet recording disk surface.

12. (Cancelled)

13. (Cancelled)

14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Withdrawn) The DASD of claim 11 wherein the longitudinal bias layer comprises an electrically nonconductive AFM material disposed outside of the active region and in abutting contact with the two opposite sides of the active region.

21. (Currently Amended) In a magnetic read head having an air bearing surface (ABS), a magnetic tunnel junction (MTJ) sensor for connection to sense circuitry for detecting changes in electrical resistance within the sensor, the sensor comprising:

first and second electrically conductive leads;

a MTJ stack sandwiched between the first and second electrically conductive leads with an active region disposed at the ABS and having two opposite sides each disposed generally orthogonally to the ABS, the first and second electrically conductive leads extending laterally beyond the active region, the MTJ stack comprising:

an antiferromagnetic (AFM) layer spanning the active region,

a pinned layer of ferromagnetic (FM) material in contact with the AFM layer,

a free layer of FM material spanning the active region, and

a tunnel junction layer of electrically nonconductive material disposed between the pinned layer and the free layer in the active region; and

a nonconductive longitudinal bias layer formed outside of the active region and in abutting contact with the two opposite sides of the active region for biasing the magnetic moment of the free layer in substantially a predetermined direction in the absence of an external magnetic field, the longitudinal bias layer consisting of a layer of electrically insulating hard magnetic material extending from the first shield to the second shield.

22. (Currently Amended) The sensor of claim 21 wherein the nonconductive longitudinal bias layer comprises nickel-oxide [a hard magnetic (HM) material].

23. (Currently Amended) A direct access storage device (DASD) comprising:

a magnetic recording disk having at least one surface for storing magnetically recorded data;

a magnetic read head having an air bearing surface (ABS) disposed for reading the data from the magnetic recording disk surface;

in the magnetic read head, a magnetic tunnel junction (MTJ) sensor comprising:

first and second electrically conductive leads;

a MTJ stack, sandwiched between the first and second electrically conductive leads, with an active region disposed at the ABS and having two opposite sides each disposed generally orthogonally to the ABS, the first and second electrically conductive leads extending laterally beyond the active region, the MTJ stack comprising:

an antiferromagnetic (AFM) layer spanning the active region,

a pinned layer of ferromagnetic (FM) material in contact with the AFM layer,

a free layer of FM material spanning the active region, and

a tunnel junction layer of electrically nonconductive material disposed between the pinned layer and the free layer in the active region; and

a nonconductive longitudinal bias layer formed outside of the active region and in abutting contact with the two opposite sides of the active region for biasing the magnetic moment of the free layer in substantially a predetermined direction in the absence of an external magnetic field, the longitudinal bias layer consisting of a layer of electrically insulating hard magnetic material extending from the first shield to the second shield;

an actuator for moving the magnetic read head across the magnetic recording disk surface to access the data stored thereon; and

a data channel having sense circuitry coupled electrically to the MTJ sensor for detecting changes in resistance of the MTJ sensor caused by rotation of the magnetic moment of the free ferromagnetic layer relative to the fixed magnetic moment of the pinned layer responsive to magnetic fields representing the data stored on the magnetic recording disk surface.

24. (Currently Amended) The sensor of claim [23] 21 wherein the nonconductive longitudinal bias layer comprises [a hard magnetic (HM) material] barium ferrite.

25. (Cancelled)

26. (Cancelled)

27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Cancelled)

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41. (Cancelled)

42. (Cancelled)

43. (Cancelled)

44. (Cancelled)

45. (Cancelled)

46. (Cancelled)